NOTES ON ANCIENT BRITISH MONUMENTS.[1]

VIII.—THE ABERDEEN CIRCLES (*Continued*).

IN my last notes I dealt, amongst other matters, with those circles devoted, as I believe, to the observation of clock-stars. It is from these that dates can be derived when we are sure of the star. I pointed out that we were not sure of the star, which might have been either Arcturus or Capella.

I must confess that although, as I have already said, there is no definite proof that the period of B.C. 600 is to be preferred to B.C. 1600 as the mean time of the setting out of the Aberdeen circles, such considerations as I then gave point to the more recent date. I may add that the N. circles, if used to determine the time at night, tell the same tale. With little knowledge of the heavens we can understand the importance of an exact alignment to Arcturus or Capella when, in my view, the astronomer-priest took his departure and told the curate left in charge to "keep her at that"; but when the stars were more familiar there would be less need to indicate the rising places of either Arcturus or Capella, and the four circles with due N. alignment indicate probably that there was no longer need for a rising star to be considered; the position of the brighter stars in relation to the Pole star in the circumpolar region itself could be used, and there can be little doubt that it then became a question of the nightly voyage of the Great Bear round Polaris. In such observations we have the beginning of the employment of the "night dial" used throughout Britain until a century ago, and of the system of observation by which the Arabs in the Soudan still tell the time at night to within ten minutes.

The question of the number of stones in the circles may also help us. The once existing condition of things at Crichie, fully illustrated in Anderson's admirable book on Scotland in pagan times ("Stone Age," p. 105), is worthy of consideration. The circle consisted of six stones only; the meridian is clearly marked, and my observations made from the outstanding stone show that it was quite accurately laid off. This fact and the other that the cist was found in the middle *of a north alignment* are, in my mind, proofs of relative modernity. One question, then, is, May we accept all small circles, such as Crichie and Tuack, as being more modern than those in Cornwall and even in Aberdeenshire, where the number of stones in the circle is greater? The many interments in these circles also favour this view.

And now a word about the May-year circles; from these astronomically we can get no date, but we know that in the south they preceded the solstitial circles, and perhaps it is permissible to make the same assumption for Aberdeenshire, but in this case we deal with recumbent stones, so again they are dissimilar, and therefore their date is probably not the same as that of those in the south.

[1] Continued from p. 489.

So far as my work has gone, we have alignments to the May year at Berry Brae and Hatton of Ardoyne; the remains of a May-year avenue at Ardlair and another marked on the Ordnance map near Kirkton of Clatt. The true azimuths of the May sunrise near Aberdeen are approximately:—

Sea horizon	N. 57 50 E.
Hills 1°	60
,, 2°	61 30

In my reductions I have taken the magnetic variation at W. 18° 45′ provisionally until the recent results obtained by the Admiralty and Ordnance Survey are known.

It is remarkable that either the recumbent stones or supporters, or both, have been disturbed in these May-year circles, suggesting a practice acted on by the Egyptian priests in regard to the worship of any other sun- or star-god than the one to which they were specially attached.

This is an argument in favour of the erection of the May-year circles before the solstitial ones at Midmar, Sunhoney and Stonehead, which have been left intact.

FIG. 22.—Contrasting the directing stone and supporters at Ardlair.

The most remarkable case of disturbance is at Ardlair, on the N.W. of the circle area.

This is one of the exceptional cases to which I referred in (2), where the only May-year avenue I have measured occurs, hence the circle may once have been a May-year one. With the single exception of Old Bourtree Bush, where the recumbent stone is due E. of the centre of the circle to define the place of the equinoctial sunsets, all the circles I have measured have the recumbent stone in the S.W. quadrant. This general condition has been previously noted by Mr. Coles, and also by Mr. Ritchie, who informs me that in the case of the only variation from this law he has noted, it is known that the recumbent stone, having been moved by the farmer, was *wrongly replaced* when he was compelled to restore it.

At Ardlair the recumbent stone is in the S.E. quadrant, but there are indications that this was not its original position. It is unlike any other recumbent stone I have seen; I believe its many sharp angles and cracks are due to the action of fire, and the angles and cracks are all the more striking since both supporters are rounded and crackless.

The removal of the stone from its position *facing* the May sunrise, subjecting it to the action of fire, and placing it between two stones in the circle, so that its *length* would lie *in the direction of that sunrise*, are all suggested as acts of the solstitial priests.

The mean of all my measures gives an azimuth

along the stone and its supporters of N. 61° 15′ E.; the azimuth of the May sunrise with hills 2° high is N 61° 30′ E.

The other exceptional case is at Garrol, where there has been great disturbance, and where, as at Ardlair, the length of the recumbent stone lies in the direction which points to the rise of the May sun, the mean of many measures giving N. 61° 45′ E.

My measurements of the May-year circles were as follows :—

May-year. Sun's Declination 16° 20′ *N.* (*May* 6, *August* 8).

Circle at—	Azimuths. Magnetic, mean of observations.	Azimuths. True, at right-angles across circle.	Elevation of the horizon.	Declination N.	Dates. May.	Dates. August.
	°	° ′	°	° ′		
Berry Brae	170	N. 61 15 E.	1	15 30	May 3	Aug. 11
Hatton of Ardoyne	166	N. 57 15 E.	½ (assumed)	17 8	May 9	Aug. 5
Mean of above...	...	...	...	16 19	May 6	Aug. 8

Some of the previous measures in Cornwall may be given for comparison :—

Monument at—	Azimuth (true).	Elevation of horizon.	Declination N.	Dates. May.	Dates. August.
	° ′	° ′	° ′		
Boscawen-un—					
Circle to two large menhirs	N. 66 50 E.	1 0	14 55	May 1	Aug. 13
Merry Maidens—					
Circle to Fougou	N. 64 0 E.	0 30	16 21	May 6	Aug. 8
Tregeseal—					
Circle to Longstones.....	N. 67 20 E.	1 18	15 3	May 2	Aug. 13
Longstone (Tregeseal)—					
To W. Lanyon Quoit ...	N. 67 0 E.	0 0	14 3	Apr. 29	Aug. 16
Down Tor—					
Direction of avenue.....	N. 67 0 E.	0 30 (assumed)	14 23	Apr. 30	Aug. 15
St. Cleer—					
Holy well to Trevethy cromlech	N. 64 0 E.	0 30 (assumed)	16 21	May 6	Aug. 8
Lesquoit cromlech—					
Orientation of cromlech.	N. 64 0 E.	1 30	16 55	May 8	Aug. 6
Druids Altar (Pawton)—					
Orientation of cromlech.	N. 64 0 E.	1 30	16 55	May 8	Aug. 6
Mean of above	...	...	15 38	May 4	Aug. 10

In addition to these, I have found[1] that Lukis[2] and Borlase[3] give plans of a number of cromlechs in Cornwall which appear to be oriented to the May sun. They are as follows :—

Cromlech.	Authority.	Azimuth.
		°
Lanyon Quoit	Borlase ; plate xxi	N. 66 E.
Mulfra Quoit	Lukis ; plate xix.....	N. 63 E.
Chywoone Quoit.....	Lukis ; plate xx	N. 64 E.
Zennor Quoit	Lukis ; plate xxi...	N. 64 E.
Three Brothers Grugith	Lukis ; plate xxiii	N. 64 E.
Mean of above... ...	... ...	N. 64° 12′ E.

Assuming an elevation of the horizon between ½° and 1°, this mean value is the exact azimuth of the May sunrise in Cornwall.

I next give details touching the solstitial circles.

[1] See NATURE, No. 1987, vol. lxxvii., p. 84, November 28, 1907.
[2] "The Prehistoric Stone Monuments of Britain—Cornwall.
[3] "Antiquities of Cornwall."

With these, accurate measurement is a difficult matter, and, as the determination of the date of erection from the variation of the obliquity of the ecliptic entails very precise measures, I content myself with pointing out that the declinations are probably solstitial and that they agree, in the mean, with the values previously obtained for the English solstitial circles.

Circle at—	Azimuths. Magnetic, mean of observations.	Azimuths. True, at right-angles across circle.	Elevation of the horizon.	Declination N.
	° ′	° ′	°	° ′
Sunhoney	1 ′	N. 52 35 E.	4	22 25
Midmar	155 15	46 30	2	23 15
Stonehead (Insch).....	146 15	37 30	1	25 41
Mean of above...	...	...	...	23 47

I append some measures made in the south of England for comparison :—

Monument at—	Azimuth (true).	Elevation of the horizon.	Declination N.
	° ′	° ′	° ′
Stonehenge—			
Direction of avenue from circle...	N. 49 34 E.	0 35	23 54
Stanton Drew—			
Great circle to N.E. circle.....	51 0	1 5	23 49
Boscawen-un—			
Centre of circle to fine menhir ...	53 30	1 15	22 58
Tregeseal—			
Centre of circle to holed stones...	53 20	1 15	23 2
Longstone (Tregeseal)—			
To Mên-an-Tol	50 30	0 34	24 7
Mean of above	...	...	23 34

General Conclusions.

Should subsequent inquiries confirm the balance of argument against the use of Capella, we shall be led to the following conclusions :—

(*a*) Dealing with the circles already measured by me in the two localities, the Aberdeen circles are more than a thousand years younger than those of Cornwall and the west coast; and here we have one reason why the east-coast circles are dissimilar, and those at Callernish and Stenness to the west are similar, to the Cornish circles.

(*b*) With this great difference of time to deal with, we have also probably a difference of origin between the West coast and East coast swarms.

(*c*) As the May year is still supreme in Scotland generally, it is clear that the solstitial Aberdonians were at some point of time overpowered in influence by a return wave from the west of Scotland.

Since my return from Aberdeen Mr. Horton Bolitho, one of the hon. secretaries of the Cornwall branch of the Society for the Astronomical Study of Ancient Monuments, and whose knowledge of the Cornish alignments is second to none, has sent me the following information concerning the circles in Perthshire :—

"I examined six circles in Perthshire last year and this, but I found no trace of recumbent stones such as are associated with the Aberdeen circles. The Perthshire circles closely resemble the circles of Cornwall, showing traces of May-year and solstitial alignments with at least one clear use of a clock-star in azimuth N. 18° E. Trees prevented any fine measurements being taken, and local assistance in searching for outstanding stones was lacking. In two of the best pre-

[1] At Sunhoney, as the recumbent stone was curved and irregular, it was simpler to measure directly across the circle at right-angles to the length of the recumbent stone ; the magnetic azimuth thus obtained was 71° 20′.

served circles I found a central or 'Gorsedd' stone, and in one case two central stones."

Mr. Bolitho's observations then intensify the purely local fashion of the Aberdeen circles.

One of the associated inquiries to which I have referred will be to trace the existence of recumbent stones in some part of Europe; another will be to see if the area of the recumbent stone has also special ethnological or craniological characteristics.

With regard to the first point, Anderson ("Stone Age," p. 124) tells us that in Norway and Sweden there is no example of a circle with a recumbent stone and supporters.

With regard to the second, the paper on British ethnology by Mr. J. Gray (*Man*, April, 1902) is full of promise.

A point worthy of notice is the great preponderance in the number of circles used to take the time at night over those enabling the seasonal changes and the sun's place throughout the year to be fixed. In Cornwall both were equally provided for.

We may, I think, include the circles with a north alignment with the clock-star circles as used to determine the time at night. They are respectively situated at Dyce, Whitehill Wood, Raes of Clune and Candle Hill (Insch). As before stated, they probably represent a later development when the observer's knowledge was so far advanced that he needed only the cardinal point in order to recognise the clock-stars which it was necessary for him to observe.

Judging by the trouble taken to determine time at night by the use of special circles in Aberdeen, religious services at fixed hours of the night are suggested to be as early as the time of the circle builders.

As these night observations were common to the two localities, we may conclude that in both, the circle associated with the *via sacra*, the chambered cairn, the holy well and the holy thorn, and the sacred festivals, represent the earlier form of the monastery buildings of later times.

I am anxious to conclude by expressing our deep obligations to many helpers. First of all to Dr. Fraser for his invitation to come and do some more work, his generous hospitality, and the use of his motor-car for the examination of the circles within a radius of twenty miles of the Granite City, some of which we saw under his own guidance. That is the first point; next comes the local help in four distinct regions—Inverurie, Durris, Buchan and Insch. For the Inverurie district Mr. Ritchie, of Port Elphinstone, gave up two of his precious Saturday holidays, during which he piloted us to many circles which he had most carefully selected from a much larger number as being best worth examining.

At Durris Mr. Braid and his son took us to the circles at Eslie and the Raes of Clune, and, further, had prepared a careful plan of the latter circle, thus fulfilling a promise made last year.

On our arrival at Mintlaw for the study of the Buchan circles, we found the Rev. Dr. Forrest, Mr. Ainslie, and his assistant, Mr. Gall, at the station, and with their help several circles near Mintlaw and Lonmay were measured.

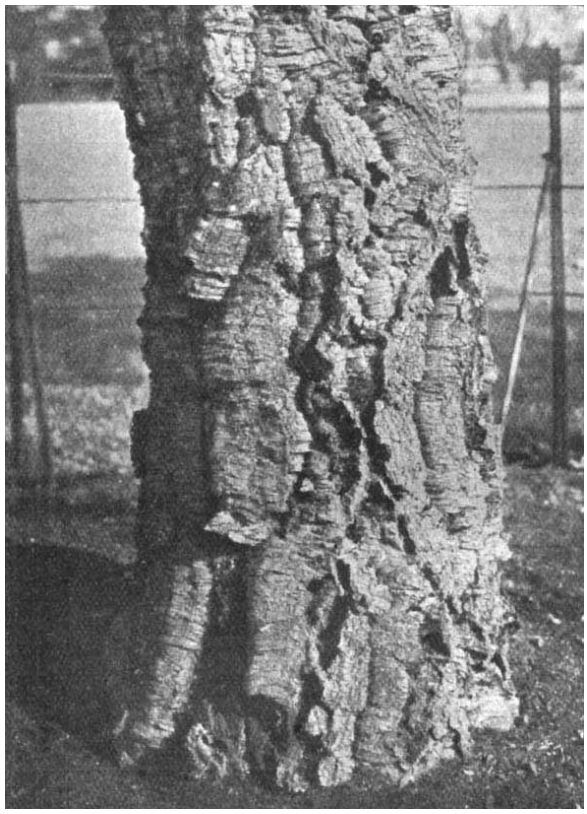
Later on we proceeded to Insch, and passed two nights in the comfortable Railway Hotel there. The obliging landlord, Mr. Haddon, had taken immense pains to secure local information. Colonel Smith, and Mr. J. Graham Callander who had only returned two days from studying Greek inscriptions in Asia Minor, accompanied us on each of the days, and with their help we were enabled to measure seven circles, some of them many miles from our headquarters.

NORMAN LOCKYER.

TREES.

AMONG the many excellent books which have been written about trees there are none, in our opinion, better than the present work. It is full of interest from cover to cover. The many beautiful photographs of the different parts of trees are strikingly true to nature, and, having been taken from fresh material, they show the salient features of the different species much more clearly than could be observed from dried herbarium specimens. We have also beautiful portraits of the various trees themselves in summer and winter condition, as well as special plates illustrating the appearance of the bark. The accompanying illustration will speak for itself.

In his introduction Prof. Groom has given a very interesting and clear account of the various members, both vegetative and reproductive, which make up the body of the tree. The special function of each part



Bark of Cork Oak. Part of an illustration in "Trees and their Life histories."

and the influence of the environment on its activity is described in a way which the non-botanical reader should have no difficulty in following and thus laying a clear foundation for the better understanding of trees and their life-histories. It is difficult to say which part of the book is best, but in the introduction the author has broken new ground. A great fault in many similar works is that they contain a mere accumulation of facts, and dry, formal descriptions of different trees and their various parts, which the non-botanical reader may learn and thus get to know the various species by head mark. This is all very well so far as it goes, but surely it will make

[1] "Trees and their Life-histories." By Prof. P. Groom. Pp. xvi+407; illustrated from photos. by H. Irving. (London: Cassell and Co., Ltd., 1907.) Price 25*s*. net.